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Abstracts of the 3rd World Congress on Agroforestry: Trees for life: accelerating the impact of agroforestry

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Edited by: MaryAnne Wachira, Betty Rabar, Christine Magaju laboratory bioassay, seed germination of test plants were significantly reduced in response to the concentrations of leaf oil. Maximum inhibition was observed with *C. argentea* followed by *C. iria* and *E. colona,* whereas, the least effect was seen on rice. Dose response curve was generated and least concentration for 50% reduction (LC_{50}) was maximum for *E. colona*, whereas, minimum for *C. argentea.* Further, seedling growth of test plants in the treated seedling was significantly reduced at concentrations from control to 5.0 ppm volatile oil.

Another greenhouse experiment was conducted to establish the herbicidal activity of *E. citriodora* against 4-week-old rice and weed species (*C. iria, E. colona* and *C. argentea*) and to explore their possible mechanism of action. Spray treatment of volatile oil on the plants of weedy species adversely affected the growth in terms of plant height, chlorophyll content and fluorescence, thereby indicating the adverse effect of eucalyptus oil on photosynthetic machinery. The increase in proline and H_2O_2 content in oil treated plants indicating oxidative stress caused cellular damage and electrolytic leakage. Therefore, it may be concluded that volatile oil of *Eucalyptus citriodora* show strong phytotoxicity and possess weed-suppressing ability. Hence, it could be used as a potential bioherbicide for future weed management programs.

Keywords*: essential oil, eucalyptus, phytotoxicity, rice, seedlings growth and weeds*

PP5.2.11. Modelling shade influence on coffee quality and its interaction with other factors using Bayesian Networks

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Coffee quality (CQ) is influenced by several factors such as genotype, altitude, climate, shading, farming system, slope exposure, soil conditions, and postharvest process. It is unclear, however, how the factors interact as most studies include only a few of them, and those with more show contradictory results. Understanding those interactions is a key step to improve the determination of CQ, and coffee production overall at farm, regional and national levels. In this study we therefore want to explore how the CQ-influencing factors interact, and how important each factor is in the explanation of the final CQ, with shading as the starting point.

To answer the question, we developed a Coffee Quality Model (CQD) for *Coffea arabica L.* implemented as a Bayesian Belief Network based on empirical data, and scientific and expert knowledge from Nicaragua. CQD includes the factors altitude, shade, farm management, coffee productivity, farm size, slope exposure, and soil texture as parent or explanatory variables. The children or response variables are physical and organoleptic CQ. The model was tested and validated against additional datasets from Nicaragua and Honduras.

CQD was able to predict both CQ components with an acceptable accuracy (RMSE), and explicitly showed the interactions between shade-altitude, shade-yield, shade-farm management, and combinations thereof which defined the CQ. Our next steps will be to further refine the model and make it applicable to other locations as well. For this we will add other coffee varieties and parent variables, implement continuous variables instead of discrete ones, and increase the number of states of the variables.